Radiological National Emission Standards for Hazardous Air Pollutants (NESHAP) 2010 Annual Report for the Department of Energy Portsmouth Gaseous Diffusion Plant, Piketon, Ohio

U.S. Department of Energy
DOE/PPPO/03-0234&D1

June 2011

By
FBP LLC, a Joint Venture Under Contract DE-AC30-10CC40017

FBP-ER-GEN-RPT-0013, Revision 3

This document is approved for public release per review by:

Henry H. Thomas 05/25/2011
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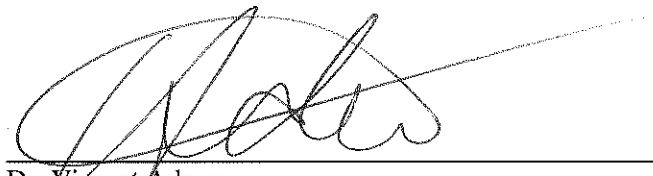
The following certifications pertain to the U.S. Department of Energy (DOE) activities at the Portsmouth site. It is DOE's understanding that the United States Enrichment Corporation (USEC) will be submitting a separate Radiological National Emission Standards for Hazardous Air Pollutants (NESHAP) 2010 Annual Report and certification pertaining to its activities at the Portsmouth site.

DOE Certification

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein and based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment. See, 18 *U.S.C.* 1001.



6/24/11

Dr. Vincent Adams
Portsmouth Site Director
Portsmouth/Paducah Project Office
U.S. Department of Energy

Date

Fluor-B&W Portsmouth LLC Certification

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein and based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment. See, 18 *U.S.C.* 1001.

Dennis / Cam for

Woodrow "Jamie" Jameson
Program Manager
Fluor-B&W Portsmouth LLC (Operator)
(For information pertaining to Fluor-B&W Portsmouth LLC sources)

6/13/11
Date

Uranium Disposition Services, LLC Certification

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein and based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment. See, 18 *U.S.C.* 1001.

Richard A Humphrey
President
Uranium Disposition Services, LLC (Operator)
(For information pertaining to the DUF_6 conversion facility)

May 26, 2011
Date

CONTENTS

TABLES

FIGURE

ACRONYMS

CAP88-PC	Clean Air Assessment Package
CFR	Code of Federal Regulations
Ci	curie
DOE	U.S. Department of Energy
DUF_6	depleted uranium hexafluoride
FBP	Fluor-B&W Portsmouth LLC
HEPA	high efficiency particulate
HVAC	heating, ventilation, and air conditioning
MEI	maximally exposed individual
mrem	millirem
NESHAP	National Emission Standards for Hazardous Air Pollutants
NPDES	National Pollutant Discharge Elimination System
pCi	picocurie
PORTS	Portsmouth Gaseous Diffusion Plant
U_3O_8	triuranium octaoxide
USEC	United States Enrichment Corporation
U.S. EPA	U.S. Environmental Protection Agency

EXECUTIVE SUMMARY

This report provides the information required by Title 40 of the *Code of Federal Regulations (CFR)* Part 61, National Emission Standards for Hazardous Air Pollutants (NESHAP), Subpart H, National Emission Standards for Emissions of Radionuclides Other Than Radon from Department of Energy (DOE) Facilities.

DOE is responsible for six sources of radionuclide emissions at the Portsmouth Gaseous Diffusion Plant (PORTS): the X-326 L-cage Glovebox, X-622 Groundwater Treatment Facility, X-623 Groundwater Treatment Facility, X-624 Groundwater Treatment Facility, X-627 Groundwater Treatment Facility and the Depleted Uranium Hexafluoride (DUF_6) conversion facility. During 2010, LATA/Parallax Portsmouth LLC was responsible for operating each of these sources except the DUF_6 conversion facility. Fluor-B&W Portsmouth (FBP) assumed responsibility for the sources (the X-326 L-cage Glovebox, X-622 Groundwater Treatment Facility, X-623 Groundwater Treatment Facility, X-624 Groundwater Treatment Facility, and X-627 Groundwater Treatment Facility) on March 29, 2011.

During 2010, Uranium Disposition Services, LLC, operated the DUF_6 conversion facility. The DUF_6 conversion facility began hot functional testing in 2010. The facility first began limited process testing on July 28, 2010, with periodic short production test runs through the end of the year. The conversion facility processes DUF_6 cylinders via a fluidized bed system to produce uranium oxide and salable hydrofluoric acid. This facility has one emission source, the conversion building heating, ventilation, and air conditioning (HVAC) stack.

In 2010, the United States Enrichment Corporation (USEC) was responsible for additional sources associated with the former gaseous diffusion process, the centrifuge enrichment technology (the Lead Cascade Test Facility), and other operations. Although the X-330, X-333, X-343, and X-344 buildings were returned to DOE in October 2010, USEC remained responsible for reporting the radiological emissions from these facilities throughout 2010.

Radionuclide emissions from the DOE sources are modeled by the Clean Air Assessment Package (CAP88-PC) Version 3.0 computer program [approved by the United States Environmental Protection Agency (U.S. EPA)] to estimate the effective dose to members of the public. Emissions from the DUF_6 conversion facility, X-326 L-cage Glovebox and the X-622, X-623, X-624, and X-627 Groundwater Treatment Facilities were used to estimate the effective dose for 2010.

The effective dose to individuals based on USEC emissions has been combined with the DOE PORTS effective dose. In 2010, the maximum effective dose for USEC was 0.051 millirem (mrem)/year, as provided to DOE by USEC. DOE is certifying the effective dose for DOE activities only. DOE is not certifying the accuracy of the USEC data, calculations, or results. DOE understands that the USEC PORTS NESHAP report will be provided to U.S. EPA by USEC and will be certified by USEC.

The DOE PORTS effective dose is combined with the USEC effective dose to determine a total effective dose from the PORTS facility. The highest combined effective dose is the maximum effective dose to the maximally exposed individual (MEI) who is a member of the public. In 2010, the maximum combined effective dose to the MEI was 0.17 mrem/year (0.12 mrem/year from DOE sources + 0.047 mrem/year from the same individual USEC source), which is well below the NESHAP standard of 10 mrem/year.

DOE collects samples from 15 ambient air monitoring stations located on and near the PORTS reservation and analyzes them for the radionuclides that could be present in ambient air due to PORTS activities. These radionuclides are isotopic uranium (uranium-233/234, uranium-235, uranium-236, and uranium-238), technetium-99, and selected transuranic isotopes (americium-241, neptunium-237, plutonium-238, and plutonium-239/240). The ambient air monitoring stations measure radionuclides released from the DOE and USEC point sources, fugitive air emissions, and background concentrations of radionuclides.

The CAP88-PC model was used to generate a dose conversion factor that was used to calculate a dose (in mrem/year) for a given activity of each radionuclide in air (in picocuries per cubic meter). A dose was computed for each ambient air monitoring station. The net dose for each ambient air monitoring station (subtracting the dose measured at the background station) ranged from 0.000020 to 0.0089 mrem/year. The highest net dose measured at the ambient air monitoring stations is five percent of the dose calculated from the combined DOE and USEC point source emissions (0.17 mrem/year). These results indicate that fugitive emissions of radionuclides from the PORTS reservation do not cause a significant dose to individuals near the site and further demonstrate that emissions of radionuclides from PORTS are well within NESHAP limits.

1. FACILITY INFORMATION

1.1 SITE DESCRIPTION

The Portsmouth Gaseous Diffusion Plant (PORTS) in Piketon, Ohio, began uranium enrichment operations using the gaseous diffusion process in 1954. In 1993, the U.S. Department of Energy (DOE) leased the uranium enrichment production and operations facilities at PORTS to the United States Enrichment Corporation (USEC). USEC enriched uranium at PORTS for use in commercial nuclear power reactors until May 2001. At that time, USEC placed the production facilities at PORTS into a cold standby mode under a contract with DOE. DOE terminated the cold standby program as of September 30, 2005, and replaced it with the cold-shutdown program. In 2010, USEC was beginning the process of returning the uranium enrichment facilities at PORTS to DOE.

USEC, Inc. (the parent company of USEC) is currently developing centrifuge enrichment technology at PORTS, including construction of both a small-scale demonstration facility (the Lead Cascade Test Facility) and a commercial-scale uranium enrichment facility (the American Centrifuge Facility). Other USEC operations at PORTS include removal of deposited uranium compounds from the gaseous diffusion enrichment cascade equipment and other activities to support ongoing and future missions.

This report covers only the DOE operations at PORTS. DOE, through its managing contractors, is responsible for the Decontamination and Decommissioning (D&D), Environmental Restoration, Waste Management, and Uranium Programs at the plant, as well as maintaining nonleased DOE property. The Depleted Uranium Hexafluoride (DUF_6) conversion facility was built for DOE at PORTS to process DUF_6 produced by the gaseous diffusion process. DUF_6, which is stored in cylinders, is removed from the cylinders and converted to uranium oxide, which will be made available for beneficial reuse, storage, and/or disposal. Initial hot functional testing was in progress in 2010 with larger-scale operation of the facility anticipated in 2011.

1.2 SOURCE DESCRIPTION

DOE PORTS has six stack sources regulated by the U.S. Environmental Protection Agency (U.S. EPA) under the National Emission Standards for Hazardous Air Pollutants (NESHAP), Subpart H: the DUF_6 conversion facility, X-326 L-cage Glovebox, X-622 Groundwater Treatment Facility, X-623 Groundwater Treatment Facility, X-624 Groundwater Treatment Facility, and X-627 Groundwater Treatment Facility.

The X-326 L-cage Glovebox has airlocks for the entry and removal of work materials and is maintained under negative pressure during use. This negative pressure is produced by an exhaust fan drawing air through a high-efficiency particulate (HEPA) filter. Effluent control is provided by the HEPA filter; calculations of emissions from the glovebox assume a HEPA filter control factor of 0.01 (99 percent efficiency) as provided in Title 40 of the *Code of Federal Regulations (CFR)*, Part 61, Appendix D. Materials contaminated with radionuclides are sampled, batched, blended, or repackaged in the glovebox and generate low emissions of radionuclides.

The X-622, X-623, X-624, and X-627 Groundwater Treatment Facilities treat groundwater contaminated with volatile organic compounds and radionuclides and release treated water through permitted National Pollutant Discharge Elimination System (NPDES) outfalls. To reduce air emissions of volatile organic compounds from the groundwater treatment facilities, a de-mister is installed on the air stripper at X-622, and off-gas carbon units are installed on the air strippers at the X-623, X-624, and X-627 facilities. The clarifier at the X-622 Groundwater Treatment Facility is part of the treatment process and is vented to the environment. No control equipment is installed on the clarifier. No control equipment is installed at any of the groundwater treatment facilities to reduce emissions of radionuclides.

The DUF_6 conversion facility produces uranium oxide dust that is primarily in the form of triuranium octaoxide (U_3O_8). Multiple prefilters and primary HEPA filter banks within the facility heating, ventilation, and air conditioning (HVAC) system control particulate emissions of oxide powder. Prior to atmospheric venting of process off gas through the stack, air passes through a secondary set of HEPA filter banks. The conversion building is also maintained at negative pressure to help eliminate the possibility of fugitive emissions.

The current Permit-to-Install and Operate for the venting system at the X-735 Landfill, issued by the Ohio Environmental Protection Agency, includes a requirement for compliance with NESHAP Subparts A (General Provisions) and H (National Emission Standards for Emissions of Radionuclides Other Than Radon from DOE Facilities), although the NESHAP provisions are administered directly by U.S. EPA.

The results of air emissions testing of the X-735 Landfill venting system, performed from September 25 through September 29, 1995, were used to calculate radionuclide emissions from the landfill. During the testing, samples were collected from a uniform pattern of 16 of the 33 landfill vents and analyzed for gross alpha activity and gross beta activity. Alpha activity was not detected in any of the samples. Beta activity was detected in 1 of the 16 samples at one picocurie (pCi)/sample, which was just above the analytical detection limit of 0.9 pCi/sample.

In the *Performance Test Report X-735 Landfill Closure (Northern Portion) Cap Construction and Gas Venting System* (DOE 1995), the average beta activity per cubic meter per vent was calculated using the conservative assumption that beta activity was being emitted at half the detection limit in the 15 vents in which beta activity was undetected. Emissions of beta activity for all 33 vents were calculated as 0.00213 pCi/min (DOE 1995).

For compliance with NESHAP Subpart H regulations, beta emissions were conservatively assumed to be technetium-99, the only radionuclide associated with PORTS activities that is a beta emitter (the transuranics and uranium isotopes associated with PORTS are alpha emitters). Because alpha activity was not detected in the emissions testing, it is not included in the dose assessment. The annual emission rate of 0.0000000011 (1.1E-09) curie (Ci)/year of technetium-99 results in a dose of 0.00000000063 (6.3E-10) millirem (mrem)/year to an individual 250 meters north of the X-735 Landfill at the PORTS property boundary. Because the dose from the X-735 Landfill venting system is more than one million times smaller than the doses from the groundwater treatment facilities and more than one billion times smaller than the regulatory limit of 10 mrem/year, the X-735 Landfill venting system is not a major contributor to the DOE dose and will not be discussed in the remainder of this report.

DOE understands that USEC will be submitting a separate NESHAP report addressing emissions of radionuclides from USEC operations.

2. RADIONUCLIDE EMISSIONS

Each of DOE's sources of radionuclide emissions are point sources that have the potential to emit radionuclides that produce a dose less than or equal to 0.1 mrem. Emissions from these sources are evaluated in accordance with 40 *CFR* 61.93(b)(4)(i), which states: *For other release points which have a potential to release radionuclides into the air, periodic confirmatory measurements shall be made to verify the low emissions.*

Section 2.1 discusses the methods used to calculate radionuclide emissions from each of the DOE sources that emitted radionuclides during 2010. Table 1 presents a summary of the radionuclide emissions from DOE sources in 2010.

Table 1. Emissions (Ci/year) from DOE PORTS Air Emission Sources in 2010

Radionuclide	X-622	X-623	X-624	X-627	X-326	DUF_6 facility
Americium-241	2.2E-07	0	0	1.2E-07	5.5E-12	-
Neptunium-237	1.1E-07	1.8E-07	0	2.6E-06	1.1E-11	-
Plutonium-238	3.9E-07	1.6E-07	4.0E-08	1.5E-07	1.9E-12	-
Plutonium-239/240[a]	3.0E-09	1.4E-07	0	1.3E-06	8.8E-12	-
Technetium-99	6.7E-02	9.5E-03	3.8E-05	4.3E-02	6.5E-05	-
Uranium-233/234[a]	9.1E-06	6.5E-05	2.0E-06	1.8E-05	5.3E-07	1.2E-08
Uranium-235	5.9E-08	2.8E-06	1.0E-07	2.0E-06	2.4E-08	5.4E-10
Uranium-236	1.8E-07	2.6E-07	3.6E-09	5.6E-07	2.9E-09	-
Uranium-238	3.3E-06	3.8E-05	5.2E-07	5.9E-06	5.7E-07	1.2E-08
Total	6.7E-02	9.7E-03	4.1E-05	4.3E-02	6.6E-05	2.4E-08

[a]Plutonium-239/240 is entered as plutonium-239 and uranium-233/234 is entered as uranium-234 in the CAP88-PC model.

Table 2 lists the distances from the DOE PORTS air emission sources to the nearest public receptors as required by 40 CFR Section 61.94(b)(6).

Table 2. Distances to Nearest Public Receptors from DOE Sources

Source	Distance in meters to the nearest public receptors					
	Resident	School	Office/ Business	Farm		
				Crops/Vegetables	Meat	Milk
DUF_6 facility	1329 W	4320 N	988 WNW	2033 W	1609 W	3900 NNE
X-326	1383 E	4999 NNW	1677 WNW	2185 WSW	1671 WSW	4498 N
X-622	1040 SE	5392 NNW	1293 SSE	2184 WSW	1495 SSE	4804 N
X-623	838 ESE	4264 NNW	2286 W	2800 SSE	1037 E	3505 NNW
X-624	579 ESE	4294 NNW	2652 W	2776 SSE	525 ESE	3353 NNW
X-627	1377 ESE	4118 NNW	5421 W	2654 W	1495 E	3439 N

2.1 POINT SOURCES

Emissions from the X-622, X-623, X-624, and X-627 Groundwater Treatment Facilities were calculated based on quarterly influent and effluent sampling at each facility, and quarterly throughput. The activity measured in the effluent sample was subtracted from the influent sample; the difference is assumed to have been emitted from the facility. As a conservative measure, radionuclides that were not detected in the samples were assumed to be present at half the undetected result.

Emissions from the X-326 L-cage Glovebox were based on the mass of the materials transferred within the glovebox, analytical data available on each material for radionuclides identified for air monitoring at PORTS (americium-241, neptunium-237, plutonium-238, plutonium-239/240, technetium-99, uranium-233/234, uranium-235, uranium-236, and uranium-238), and emission factors provided in 40 CFR Part 61 Appendix D.

Emissions from the DUF_6 conversion facility were based on the annual emissions provided in the facility's Permit-to-Install issued in 2006. The DUF_6 conversion facility began processing one of the three DUF_6 lines on July 28, 2010. Emissions were based on 156 days of operation (July 28 through December 31) and one-third of the annual emissions (operation of one of the three processing lines).

Table 1 identifies the emissions from these sources for 2010.

2.2 FUGITIVE AND DIFFUSE SOURCES

Fugitive and diffuse emissions include all emissions that do not pass through a discrete stack, vent, or pipe. Potential emissions of diffuse and fugitive emissions at PORTS include normal building ventilation, soil and groundwater remediation sites, and wastewater treatment facilities.

Ambient air monitors are used at PORTS to confirm that radiological emissions from the site produce a dose much less than the level allowed by regulations. The ambient air monitors are divided into three groups: on site, property line, and off site. One monitor is located 13 miles southwest of the facility to measure background levels of radionuclides.

Samples are collected weekly from the monitoring stations. Samples are then composited into a monthly sample and analyzed for radionuclides representative of PORTS operations. Analyses for transuranic radionuclides (americium-241, neptunium-237, plutonium-238, and plutonium-239/240) are performed quarterly based on the infrequent detections of these radionuclides. Analyses of technetium-99, uranium-233/234, uranium-235, uranium-236, and uranium-238 are performed monthly. Section 4.3, Table 6, provides a dose estimate for each ambient air monitoring station based on the results of this ambient air sampling.

3. DOSE ASSESSMENT

3.1 DESCRIPTION OF DOSE MODEL

CAP88-PC Version 3.0, a computer program approved by U.S EPA for compliance with 40 *CFR* Part 61 Subpart H, was used to calculate the dose from DOE PORTS radionuclide emissions to air. The program uses a modified Gaussian plume equation to estimate the dispersion of radionuclides. The program computes radionuclide concentrations in air, rates of deposition on ground surfaces, concentrations in food, and intake rates to people from ingestion of food produced in the assessment area.

3.2 SUMMARY OF INPUT PARAMETERS

Input parameters for the CAP88-PC model include physical parameters for each radionuclide emission source, radionuclide emissions, meteorological data, and agricultural data. Table 1 (Section 2.1) provides the radionuclide emissions for each source. Default values were used for the size and class of each radionuclide. Table 3 provides the physical parameters for each source.

Table 3. Physical Parameters for DOE Air Emission Sources

Parameter	X-326	X-622[a]	X-623	X-624	X-627	DUF_6 facility
Stack height (m)	22	8.1	7.6	6.1	6	21.9
Stack diameter (m)	0.36	0.3	0.2	0.2	0.2	1.52
Exit velocity (m/sec)	6.35	2.9	15.5	20.6	11	7.85

[a]The two emission points at the X-622 (air stripper and clarifier) are modeled as one source.

Site-specific meteorological data were used in the CAP88-PC model. The following data were collected for calendar year 2010:

Annual precipitation:	90 cm/year
Average air temperature:	12 °C
Average mixing layer height:	575 meters

Precipitation was measured by an automated gauge near the on-site meteorological tower, which is backed-up by an automated gauge at the X-230L North Holding Pond. Air temperature was measured at the on-site meteorological tower. The wind file used in the CAP88-PC model was generated from data collected at the 30-meter height from the on-site meteorological tower.

It should be noted that the default values provided with the CAP88-PC model can be very conservative. The rural food array used to estimate the DOE PORTS dose assumes that the public obtains all foodstuffs within 50 miles of the plant (see Table 4). In reality, the majority of the foodstuffs consumed locally are purchased at supermarkets that receive foodstuffs from all over the world.

Table 4. Agricultural Data: Rural Default Food Array Values

Fraction of Foodstuffs	Local Area	Within 50 Miles	Beyond 50 Miles
Vegetables and produce	0.700	0.300	0.000
Meat	0.440	0.560	0.000
Milk	0.400	0.600	0.000

3.3 RESULTS

The CAP88-PC model estimated the 2010 maximum effective dose for the maximally exposed individual (MEI) near PORTS based on emissions from DOE PORTS sources to be 0.12 mrem/year. This effective dose includes dose contributions from all of the radionuclides listed in Table 1.

The effective dose to individuals based on USEC emissions has been combined with the DOE PORTS effective dose. In 2010, the maximum effective dose for USEC was 0.051 mrem/year, as provided to DOE by USEC. DOE is not certifying the accuracy of the USEC data, calculations, or results. DOE understands that the USEC PORTS NESHAP report will be provided to U.S. EPA by USEC and will be certified by USEC.

The DOE PORTS effective dose is combined with the USEC effective dose to determine a total effective dose from the PORTS facility. The highest combined effective dose value is the maximum effective dose to the MEI (see Table 5). In 2010, the maximum effective dose to the MEI is 0.17 mrem/year (0.12 mrem/year from DOE sources + 0.047 mrem/year from USEC sources), which is well below the NESHAP standard of 10 mrem/year.

Table 5. Summary of the Effective Dose (mrem/year) to the DOE, USEC, and Combined MEIs in 2010

	Location [distance (meters), Direction, and DOE Source]	Dose from DOE Sources	Dose from USEC Sources	Combined Dose
DOE MEI location and maximum combined MEI location (DOE + USEC)	2050 NE of X-622 914 E of X-623 579 ESE of X-624 1499 E of X-627 1995 ENE of X-326 2250 E of DUF_6 facility	0.12	0.047	0.17
DOE MEI location (2^{nd} location)	1683 NE of X-622 838 ESE of X-623 671 SSE of X-624 1377 ESE of X-627 1677 ENE of X-326 2000 E of DUF_6 facility	0.12	0.043	0.16
USEC MEI location	2301 NE of X-622 1067 ENE of X-623 640 E of X-624 1634 E of X-627 2215 NE of X-326 2400 ENE of DUF_6 facility	0.11	0.051	0.16

4. ADDITIONAL INFORMATION

4.1 NEW/MODIFIED SOURCES

In 2010, no DOE construction or modification activities received a waiver under 40 CFR 61.96.

4.2 UNPLANNED RELEASES

There were no unplanned releases of radionuclides during 2010.

4.3 DOSE CALCULATIONS FOR EVALUATION OF DIFFUSE/FUGITIVE EMISSIONS

Ambient air monitoring stations (see Figure 1) measure radionuclides released from the DOE and USEC point sources (see Table 1), fugitive air emission sources such as those discussed in Section 2.2, and background levels of radionuclides. Samples are collected weekly from 15 stations and composited monthly. Analyses for transuranic radionuclides (americium-241, neptunium-237, plutonium-238, and plutonium-239/240) are performed quarterly based on the infrequent detections of these radionuclides. Analyses of technetium-99, uranium-233/234, uranium-235, uranium-236, and uranium-238 are performed monthly.

The CAP88-PC model is used to generate a dose conversion factor for each radionuclide. The dose conversion factor is used to compute a dose in mrem/year for a given activity of a radionuclide in air (in picocuries per cubic meter). For radionuclides that were detected in ambient air during 2010, the dose for that radionuclide is calculated by using the maximum activity of each detected radionuclide. For radionuclides that were never detected, the dose is calculated by using half of the highest undetected result to calculate the maximum activity of the radionuclide in air. The doses attributable to each radionuclide are then added to obtain the gross dose for each station. The net dose is obtained by subtracting the dose at station A37, the background monitoring station.

Table 6 summarizes the total dose (both gross and net) for each station. The highest net dose for the ambient air monitoring stations was 0.0089 mrem/year at station A23, which is on the northeastern PORTS property boundary.

Table 6. Summary of Doses (mrem/year) at Ambient Air Monitoring Stations in 2010

Station	Gross dose	Net dose	Station	Gross dose	Net dose
A3	1.6E-03	1.5E-03	A24	5.7E-03	5.6E-03
A6	3.4E-04	2.8E-04	A28	8.0E-05	2.0E-05
A8	2.0E-03	1.9E-03	A29	9.6E-04	9.0E-04
A9	3.2E-04	2.6E-04	A36	2.9E-03	2.8E-03
A10	1.1E-03	1.0E-03	A37 (bkg)	6.1E-05	-
A12	2.0E-03	1.9E-03	A41	5.4E-04	4.8E-04
A15	1.1E-03	1.0E-03	T7	2.8E-03	2.7E-03
A23	9.0E-03	8.9E-03			

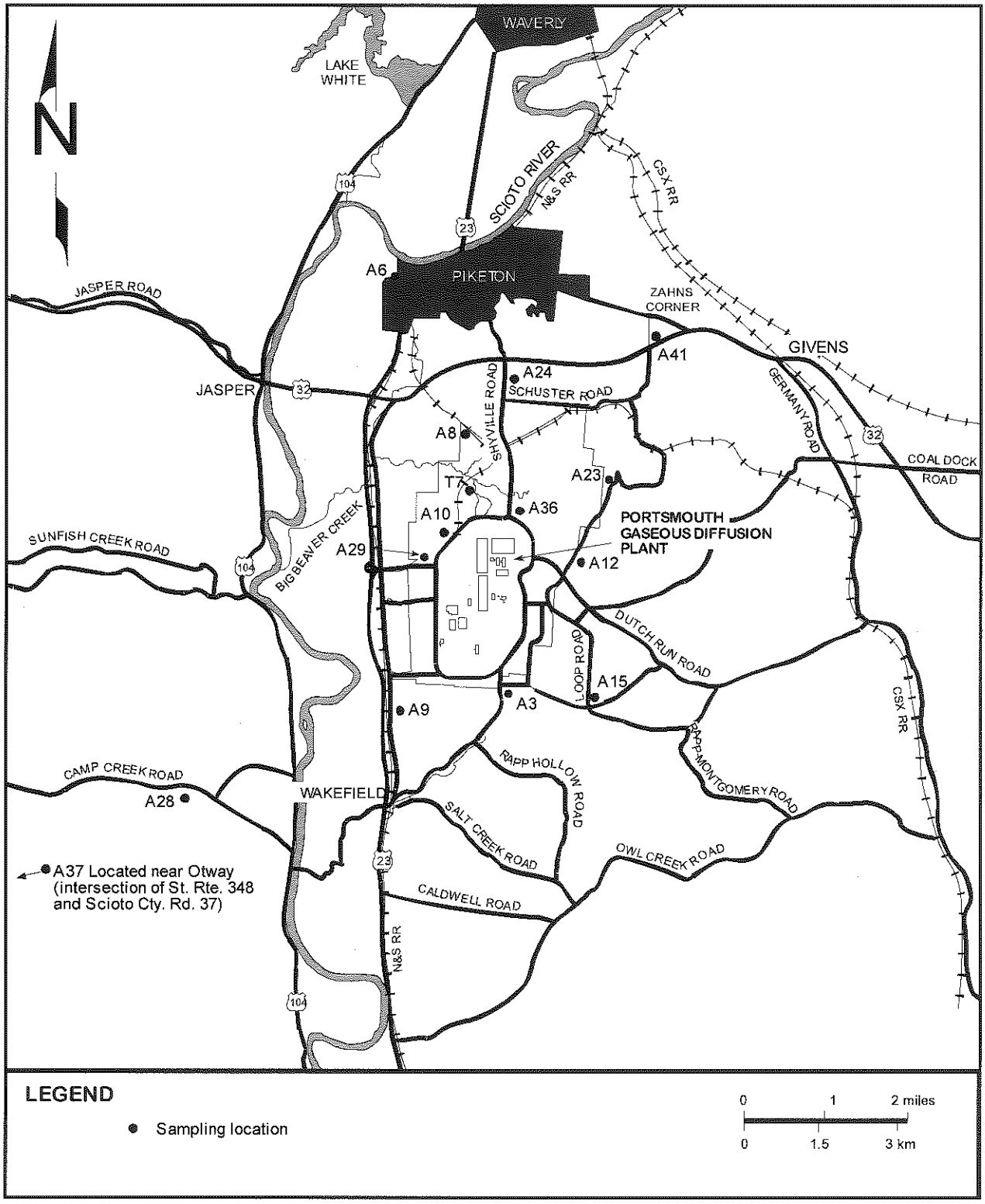


Figure 1. DOE PORTS Ambient Air Monitoring Stations

The highest net dose measured at the ambient air monitoring stations (0.0089 mrem/year) is five percent of the dose calculated from the combined DOE and USEC point source emissions (0.17 mrem/year). These results indicate that fugitive and point source emissions of radionuclides from the PORTS reservation do not cause a significant dose to individuals near the site and further demonstrate that emissions of radionuclides from PORTS are well within NESHAP limits.

4.4 DOSE CALCULATIONS FOR SECURITY FENCE LINE LOCATIONS

Per request by U.S. EPA Region 5, a dose calculation using the CAP88-PC model was also completed for locations around the perimeter of the security fence of the PORTS process area (the limited access area). Emissions from the DOE PORTS radionuclide sources (the X-326 L-cage Glovebox, X-622, X-623, X-624, and X-627 Groundwater Treatment Facilities, and DUF_6 conversion facility) were used to determine the dose to a hypothetical person living at the fence line for the limited access area at each of the 16 directional sectors around the plant (i.e., north, north-northeast, northeast, east-northeast, etc.). The maximum dose a hypothetical person living at the PORTS security fence line would receive from DOE PORTS radionuclide emissions is 0.93 mrem/year at the south-southeast sector of the security fence line for the limited access area.

4.5 REFERENCES

DOE 1995. *Performance Test Report X-735 Landfill Closure (Northern Portion) Cap Construction and Gas Venting System*, DOE/OR/11-1420&D1, POEF-ER-4626&D1. Lockheed Martin Energy Systems, Piketon, Ohio.

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